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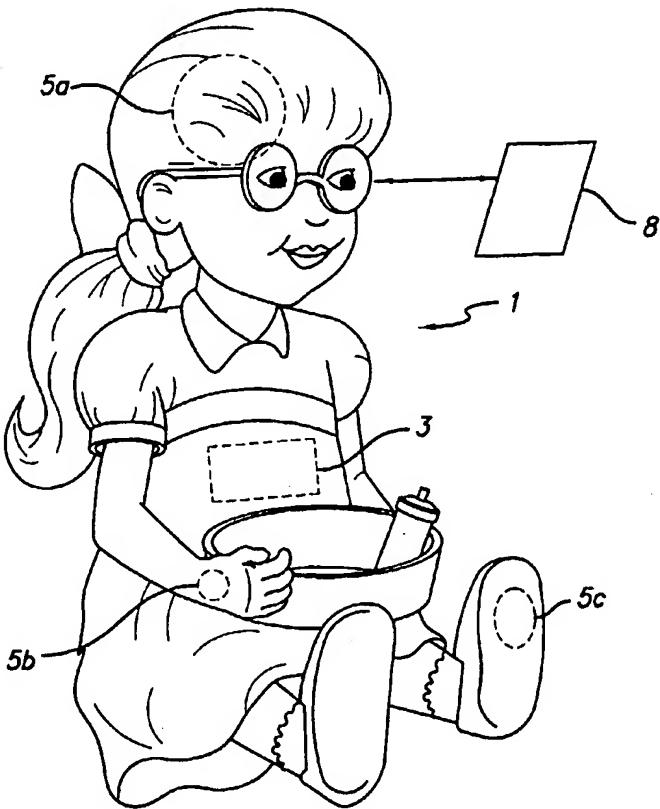
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(54) Title: OBJECT RECOGNITION TOYS AND GAMES



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(57) Abstract: A toy or game play apparatus or method involving a powered host such as a doll or a tablet which operates interactively with one or more non powered play objects. The host has a preprogrammed microcontroller and a RFID reader/interrogator circuit with at least one antenna. Each play object has a RFID tag IC and an antenna. Each tag IC has data that includes at least ID information different from that of other play objects. When the host and a play object are positioned so as to afford RF communication between their antenna, the host sends power to energize the tag IC of the play object. This causes the tag IC to transmit data and makes a presentation to the user caused by that transmitted data. Some or even all of the presentation may be the data from the play object. In one mode the host may direct the user to position one or more designated play objects relative to the host, recognize whether or not the correct positioning has been achieved, and advise the user accordingly. The host may have multiple antennae at spaced apart locations, and may direct, recognize and advise as to play objects at each such location.



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**OBJECT RECOGNITION TOYS AND GAMES**Background of the Invention

Toys are known which can respond to radio frequency signals, e.g., toy vehicles having radio frequency transmitting remote control units. Such toys typically respond to simple signals as for "forward", "stop" and "reverse" functions. They require batteries in both the toy and transmitter.

RFID (radio frequency identification) transponder technologies are known in the prior art and used in retail store environments to sound an alert when products for which payment has not been made are removed from the premises, and in other detection systems such as automated toll collection systems for highways, bridges and tunnels, e.g. "EZ Pass".

RFID electronic components, "reader/interrogator" and "tag", circuits, are presently available in small, IC packages from several semiconductor vendors such as Philips, Motorola, Texas Instruments, Microchip, and Atmel, to name just a few suppliers.

Summary of the Disclosure

In accordance with the disclosure, contactless identification of objects by toy dolls and other toys can be achieved through the use of RF (radio frequency) transponders. A

master/host/server toy or game unit can identify and recognize something that is placed within range of the host without any physical or mechanical contact through the application of RFID technology. Objects to be recognized and identified by the master/host/server toy or game unit need only contain a small RFID tag transponder integrated circuit chip (tag IC) and a suitable RF antenna. Such objects do not require a self-contained battery or other power source to be recognized. No optical code (e.g. bar code), invisible ink, ultraviolet or infrared ink is required, nor is mechanical or physical contact necessary between the recognizing toy and object to be recognized.

Tag ICs can respond differently from one another when interrogated by an appropriately programmed master/host/server toy or game unit. The tag ICs transmit and receive information in the form of data bit streams to and from the master/host/server toy or game unit. The tag ICs receive their operating power from the RF energy transmitted by the master/host/server at the same time as data exchange occurs.

In addition to a toy or game master/host/server reading an object's identity from its tag IC chip, tag IC chips can receive information in the form of many digital bits written back and stored indefinitely in non-volatile memory onboard the tag IC chip. This feature enables the creation of a form of kid's money, or a portable store of value, that

can be held, transferred, traded, or otherwise exchanged with compatible devices such as trading cards or "play money" which contain read/writeable RFID tag ICs containing non-volatile, electrically reprogrammable memory bits, utilizing appropriately programmed master/host/server toy or game units containing an RFID reader/interrogator circuit and suitable antenna.

This feature also could be used with a doll to simulate consumption and replenishment of a resource, such as pretend milk in a toy milk bottle given to the doll. When a child presents a "full" milk bottle with an RFID tag IC inside it programmed as "full", then the doll can simulate drinking the milk, and the master/host/server can gradually reprogram the RFID tag IC in the milk bottle to be less and less full, as indicated by the setting of some selected data bits in the milk bottle RFID tag IC memory, via the rewriteable feature. When the milk bottle is "empty" the doll could possibly cry and ask for more milk. Then the toy milk bottle would have to be taken over to a different master/host/server toy, perhaps in the form of a cow or a dairy, so as to be "refilled" by way of having the selected data memory bits of the milk bottle RFID tag IC be reprogrammed accordingly.

A trading card, or a flash card, or other small object, can be provided with an

embedded RFID tag chip and suitable antenna loop or coil, factory programmed with specific bits of read-only data in the tag IC memory. This card can be recognized by a talking doll, for example, that can then recite information about the card. The information can exceed that printed on the card and, for example, can contain secret information about the card that can only be accessed by a master/host/server toy or game unit. A doll can then recognize and recite information about the trading card. In other words, at least some of the recited information may be stored on the card. Possibly most or even all of the recited information may be stored on the card. This can greatly minimize the requirement on the doll memory to store such recited information.

A tag IC with a suitable small antenna loop or coil can also be placed inside a small plastic figure, such as an action figure molded from plastic, that can be recognized by the doll or a reader device.

Such master/host/server toy or game units can play games such as spelling games, arithmetic games, shape recognition games, and other games. Master/host/server toy or game units can be employed to recognize trading cards and other two and three dimensioned collectibles. A master/host/server toy or game unit can act on a tag IC in a collectible to change its data thereby selectively making it compatible or incompatible

with other master/host/server toy or game units, thereby providing the ability to "catch" or "collect" a specific object or flash or trading card by a specific owner, after which it cannot be caught or collected by another, unless the owner agrees to trade it electronically to another owner, using the master/host/server toy or game controller.

#### Description of the Drawings

Fig. 1A is a perspective view of one type of toy which can serve as a master/host/server toy in accordance with a preferred embodiment of the invention;

Fig. 1B is a perspective view of another type of toy which can serve as a master/host/server toy in accordance with a preferred embodiment of the invention;

Fig. 2 is a functional schematic block diagram of a master/host/server toy and the objects which it is intended to sense in accordance with a preferred embodiment of the invention;

Fig. 3A is an elevation view of another preferred embodiment of the invention.

Fig. 3B is a plan view of the preferred embodiment of the invention shown in Fig. 3A.

Fig. 3C is an elevation view of the preferred embodiment of the invention shown in Fig. 3A, with a modification.

Fig. 4A is a front elevation view of still another preferred embodiment of the invention.

Fig. 4B is a side elevation view of the preferred embodiment of the invention shown in Fig. 4A.

#### Description of the Preferred Embodiments

In a first embodiment of the invention, RFID technology is used to make a doll appear to "see" flash cards or other objects, recognize them by name, and engage in play activity with them.

For example, in a "shape" game, the doll asks a child to show or give the doll a specific shape, such as "the blue square" or "the red triangle". The doll has a small loop antenna inside a hollow cavity in the chest area, so that as flash cards or objects are presented to the doll to "hold in its arms", a master/host/server toy or game unit program can detect them and respond with a voice in the appropriate manner.

Furthermore, the sensing coil antenna of the master/host/server contained in the doll, can be located in different places, such as the head, or in a hand or foot, to localize the region where the target object will be detected.

In addition, the doll could include not just one, but multiple sensing antennae coils,

located in various places on the doll, and which are switched on and off by control of the host microprocessor system. Such locations could include a coil in each hand of the doll, a coil in each foot, a coil in the doll's head, and a coil in the doll's abdominal cavity. Such a doll could play games with multiple objects, but might also play games with a single object by directing the user to sequentially position that object at different antenna, and recognizing and reporting back to the user as to the success or failure of each attempted positioning.

In conjunction with the selectively switching of the active antenna coil, the doll could ask the child to place a specific object in the doll's right hand, or in its left hand, for example.

Utilizing a voice synthesizer, the doll can ask for specific shapes to be given to it, and then for them to be taken away, one at a time, with responses given as to whether each correct shape was provided.

Objects presented to the doll can have numbers or spelling words which can be enunciated by an electronic voice synthesizer in the doll. The master/host/server toy or game unit can make animal sounds or other sound effects corresponding to a picture card or sculpture of a presented

animal or other sound effect such as a fire engine or motor car. The master/host/server toy or game unit may be provided with recorded or synthesized music for playing different songs and tunes, perhaps in different voices or with different sounding musical instrument sounds such as a trumpet or a flute, a violin or a trombone, and also with many different percussion sounds such as drums, bells, whistles, and other sound effects.

In accordance with the disclosure, a doll or other master/host/server toy or game unit can recognize and identify an object, flash card, token, or other thing with no physical or mechanical contact. The toy or doll or game can recognize just one thing at a time, or a multiplicity of many things at the same time (that is within a few hundred milliseconds of one another) by utilizing the so-called "anti-collision" feature of certain RFID tag ICs which are commercially available.

Referring to Figs. 1A and 1B of the drawings, there are shown a girl doll 1 and a baby doll 2, respectively, each of which can contain an "engine" in the form of a master/host/server toy or game unit 3. In addition to an integral antenna 5 located within the master/host/server toy or game unit 3 mounted in the doll's chest cavity, another antenna 5a can be connected to the master/host/server toy or game unit 3 and mounted within the head of the dolls 1 and 2. Doll 1 is shown with added antenna 5b at a hand

and 5c at a foot. Each of the dolls 1 and 1 is shown interacting with an object 8 in the form of a card.

Referring now to Fig. 2, there are shown a plurality of play objects 8 that each include a non-self-powered RFID transponder tag IC 8a and an RF antenna 8b. The play object may be a flash card, a trading card, or small object molded from a non-conducting, non-RF shielded material.

Fig. 2 also shows a master/host/server toy or game unit 3 having an RF transmitting and receiving antenna sensing element or coil 5. This antenna may be of the primarily inductive coupling or primarily capacitive coupling type. The master antenna element or coil 5 is tuned to the resonant operating frequency of the RFID Tag ICs, and their associated antennae. The master antenna element or coils 5 are operatively connected to a reader/interrogator circuit 7. The circuit 7 transmits power to, and receives data transmitted from, the RFID tag ICs 8a. The circuit 7 may also transmit data to the tag ICs. The play object 8 may typically be positioned about one to four inches from the master antenna 5, or possibly further.

When the reader circuit 7 transmits energy to a tag IC, that tag IC uses the power to transmit its unique data back to the circuit 7. The master unit 3 then uses that unique

data to identify or "recognize" that object 8.

The reader/interrogator circuit 7 is operatively connected to a microcontroller/microcomputer 13. The microcomputer 13 has a microprocessor. The microprocessor is connected to one or more ROMs (read-only memories) 14 that contain program code for controlling the responses of the master/host/server toy or game unit 3 to the data received from the tag ICs 8a. Thus, the data from the tag IC "triggers" or causes the response of the host unit 3. The microprocessor is also connected to RAM (random access memory) for temporary storage of operating data. Provision for connecting additional ROMS 15 to expand operating functions and modes is provided in the form of external cartridge connectors 17 which allow additional ROMs 15 to be piggybacked onto or daisy chained to the basic ROMs 14. The microcomputer 13 may have a plurality of miscellaneous I/O lines to arm/hand switches and other doll sensors.

A voice/sound synthesizer circuit 19 is connected to the microcomputer 13 for converting digital data signals generated by the microcomputer in response to or caused by the data received from the interrogated tag ICs 8a to analog voice, music or other sound signals. The sound circuit 19 may include CELP, ADPCM or the like. As noted above, at least some, and possibly most or all, of the data signals generated may be data

returned from the memory of the object 8. The analog sound signals are then applied to the input terminals of an audio amplifier 21 for driving a speaker 23 which reproduces the sounds for listening at an audible level. The microcomputer 13 and its associated components, including the microprocessor, the voice/sound synthesizer circuit 19, and the amplifier 21 are powered by batteries contained in a power supply 25. For example, four AA or C alkaline batteries may be used. DC operating power can also be supplied from main AC line voltage by way of a suitable step-down transformer, rectifier and filter circuit as is commonly found in small, plug-in power supplies, so as to save on use of batteries when in a fixed location. DC operating power could also be supplied from 12 VDC found in motor vehicles such as cars, trucks, busses, campers and even airplanes, by way of a suitable electrical connector and cable connected to a DC voltage regulator in the doll engine 3.

"Smart trading cards" are another toy or game application of RFID technology according to the invention. Trading cards, e.g., baseball cards, football cards, and other collectibles can each contain an embedded RFID tag IC for enabling novel uses for trading cards and collectibles in conjunction with dolls, and various other master/host/server toy or game units. The master/host/server toy or game unit can then

detect each collectible as it is added to the collection and maintain information about the inventory of collectibles. Each collectible can have, stored in its tag IC, data which associates the collectible with its owner. No other master/host/server toy or game unit can recognize the collectible until its owner enables the stored data to be changed for associating it with a new owner's master/host/server toy or game unit. That is, once a specific figure or other collectible is "caught" or "collected" once by someone, it cannot be caught or collected again by someone else, unless it is "traded" by the original owner to a new owner.

In still another embodiment of the invention, an RFID tag IC can be used to store the "collection" and "ownership" values in the memory of a tag IC embedded in an owner or collectors "master card", and to allow for trading or exchange of value with another owner/collector for creating "kid's money."

Referring now to Figs. 3A and 3B, in still another embodiment of the invention, RFID tag ICs 108a and suitable antenna 108b can be embedded inside of play objects 108 in the form of small play blocks molded from plastic, carved from wood, or other non-conducting, non-RF shielding materials. The master/host/server and control engine 103 is contained inside of a large tablet shaped form 101. The engine 103 includes the

sensing antenna coil 105 in the surface 109, a reader/interrogator circuit 107, a microcontroller 113 with voice/sound generator IC 119, an audio amplifier and speaker 121/123, and batteries 125, similar to the arrangement shown in Fig. 2.

The “magic tablet” 101 can recognize the play blocks 108 placed on it. The play blocks 108 may have printed or molded legends 108d on one side of the cube, such as letters of the alphabet, numbers, arithmetic signs such as +, -, / and X, or pictures or icons of animals such as cows, horses, chickens, or pigs, or other objects such as musical instruments, musical notes, or other things.

The magic tablet 108 has a similar “engine” 3 as the doll previously described. The control program could operate in many different modes.

In speaking only, the tablet voice just says the name of a letter or number block placed on it.

The magic play blocks 108 and tablet 101 may have complementary Velcro, or possibly magnetic, surfaces 110a, 110b for establishing a preferred orientation of each block and its antenna 108b to the tablet and its antenna 105 so as to maximize the RF energy transferred between the master/host/server and the RFID tag IC 108a and antenna 108b contained inside the block or object 108 placed on the magic tablet.

Alternatively, referring to Fig. 3C, the play block or object 208 could contain the RFID tag IC 208a and small loop antenna coil 208b in a diagonal orientation inside the play block or object, so that regardless of the play block or object orientation to the tablet surface 209, the loop coil antenna 208b inside the play block or object will couple sufficient RF energy to the associated RFID tag IC 208a in that play block for proper operation with minimal transmitted power.

The tablet 101 can also ask a child to spell a word such as D-O-G and then detect when the correct letter play blocks 108 have been placed on the tablet, and speak accordingly, correct or not, to help teach a child how to spell.

Detection of multiple play blocks or objects 108 is again accomplished by the control program of the microcontroller 113 and the reader/interrogator circuit 107.

The circuit of the reader/interrogator 107 operates at the selected RF frequency of the RFID tag IC 108a and antenna 108b. Commonly used frequency ranges are 100-150 kHz, or 13.5 MHz nominally, or other frequencies.

The specific methods of data modulation used in a specific RFID tag system are not of consequence to the inventions of toys and games. The basic operation of the invention can be adapted to various modulation methods and frequency ranges,

depending on the cost of the circuits and the range of operation.

It is very important to note that the detailed control of the reader/interrogator circuit and the data transmission and reception is highly dependent on the control of the reader/interrogator circuit which is effected by portions of the operating system and drivers contained in the main "engine" 3.

The disclosed master/host/server toy or game unit 3 can deal with detecting multiple play objects 8, i.e., where more than one play object 8 are presented to or removed from the toy or game master 3.

For example, a doll 1 can ask to "see" three shapes in flash cards or play objects 8 containing suitable RFID tag ICs 8a. Then the doll can ask for one of the shapes or objects 8 to be removed. If the incorrect one is removed, the doll will recognize that, and speak a suitable warning response.

Because a considerable amount of power is consumed with the activation of the reader/interrogator circuit 7 to transmit RF energy to detect the possible presence of an RFID tag IC 8a within the range of the master/host/server toy or game unit, such operation must be managed carefully. The master control program can manage the activation of the reader/interrogator circuit 7 on a time multiplexed basis, so as to

conserve power in operation and therefore prolong the battery life of the toy or game.

For example, the discussed apparatus provide for the time multiplexed activation of the reader/interrogator circuit 7 on a time interval basis to conserve battery power. Rather than leave the reader/interrogator circuit 7 activated on a continuous basis, the master/host/server toy or game unit 3 the apparatus only activate this circuit 7 very briefly a few times per second, until a suitable RFID tag IC 8a is found to respond. In this manner the method of control reduces the power consumption by a significant amount, and extends the battery life of the toy or game unit.

Referring now to Figs. 4A and 4B, there is shown a smart trading card master device 303 in the form of a hand held reader for smart trading cards or flash cards 308. A trading card 308 can be slid into a mechanical slot 312 provided for the purpose of holding the card 308 in place or the card can be placed on the surface of a hand held reader.

The reader 303 has a reader/interrogator circuit 307 and antenna 305 for communicating with the RFID tag ICs 308a embedded within the trading or flash cards 308. The trading card control master 303 can read and write back selected data information to and from the RFID tag IC 308a embedded in the trading card 308. This

is performed under the control of a single chip microcontroller 313 which includes a speech/sound synthesizer circuit 319 with digital to analog converter suitable to drive audible sounds from a miniature loud speaker 323 inside the unit.

Moreover, the microcontroller 313 can include the circuitry to drive segments and layers of a common, multiplexed LCD alphanumeric display screen 314 on the master unit, whereby information can be visually displayed. Power to the master device 103 may be provided by batteries 325.

In addition, the microcontroller can include circuitry to communicate with an external device such as a personal computer, a hand-held computer, or other device, via a wired serial communications interface for RS-232, USB, IEEE 1394 or other standard or custom communications network.

With such a network communications link, information about the trading cards, their values, ownership, or other information can be communicated to other programs and services, and could also be conveyed via the Internet to various websites offering prizes, recognition, or other services to the card collector or game or toy player.

In a text to speech application of the invention, words and phrases can be encoded in the tag IC memory in the form of ASCII or other generally known and used character

encoding techniques by using RFID tag ICS with a sufficient number of data bits or read only or read/write memory.

For example, the word "HOUSE" can be encoded in 6 bit ASCII code, that is 6 data bits per alphanumeric character, using a total of only 30 data bits. The RFID tag IC containing this data bit pattern could be embedded inside a flash card, a trading card, or any other small two or three-dimensional object.

Upon detection and query of the flash card, trading card, or other object by the doll, a reader or other master/host/server toy or game unit, programmed to recognize the encoding of words, the five letters of the example word "HOUSE" would be received and then conveyed to a software program and/or combination of software program and voice sound or speech synthesizer, in any of many various languages, to be converted into the spoken word "HOUSE" by the toy or game unit.

A very important feature of this embodiment of the invention is the ability to form hundreds or thousands, or more, flash cards, trading cards, or other objects containing RFID tag ICs, which then cause the master/host/server toy or game unit to speak, or to display and speak, the word or words programmed within them. This is significantly different from using a master/host/server toy or game unit that has a sound and speech

voice synthesizer using only pre-recorded words or phrases of language, which would be activated by control and behavior programs in the toy or game unit.

In the foregoing embodiment of the invention, there can be a virtually unlimited range or spoken words and phrases, activated by one or more suitably programmed RFID tag ICs contained in flash cards, trading cards, or other objects. As noted above, if desired, the major portion, if not all, of the spoken or displayed data may come from the object's memory. The main advantage of this implementation is that the toy or game unit does not have to be completely pre-programmed with all the words it might ever have to speak or say or display. Rather, the toy or game unit need only have a text-to-speech converter program in its control program, with proficiency in one or more spoken languages. Such a toy or game unit could be of use in learning and teaching various languages.

The number of data bits in the RFID tag IC, perhaps as many as one thousand bits, could contain as many as 150 alphanumeric characters, (i.e. letters, numbers, punctuations, and other control codes) sufficient so that one flash card, trading card, or RFID tag IC equipped object, could cause the doll, master/host/server toy or game unit to speak a specific sentence or sentences of multiple words and phrases.

**What is Claimed is:**

1. A toy or game play apparatus comprising:

a plurality of play objects each having a non-self-powered RFID tag IC and an associated play object antenna, each of said tag ICs having data that includes at least specific information that is different for each of said objects, and a powered master unit that includes a preprogrammed micro-controller and a RFID reader/interrogator circuit with at least one associated master antenna, said master unit being operable, when the antenna of a selected one said play objects is positioned in a localized detection region relative to said master antenna so as to afford RF communication between said master unit circuit and the tag IC of that selected play object, but without requiring physical contact between said master unit and that play object, to send power to energize that tag IC to cause that tag IC to transmit at least its specific information data back to said master unit, said master unit also being operable to recognize that transmitted data and to make a presentation to the user of the toy or game apparatus caused by that transmitted data.

2. The toy or game play apparatus of Claim 1 wherein, when a plurality of said play objects are generally concurrently positioned in one of said detection regions relative to one of said master unit antennae, said master unit is capable of sequentially energizing said tag ICs of said play objects so as to cause each of said play objects, as it is energized, to transmit at least some of its specific information data back to said master unit.

3. The toy and game play apparatus of Claim 1 wherein said presentation comprises at least in part at least some of said transmitted data from the tag ICs.

4. The toy and game play apparatus of Claim 1 wherein said master unit has stored data and said presentation comprises at least in part at least some of said data stored on said master unit.

5. The toy and game play apparatus of Claim 1 wherein said master unit also includes a visual display for making said presentations in visual form to the user caused by the data from the tag ICs.

6. The toy and game play apparatus of Claim 1 wherein said master unit also includes an audio sound presenting unit for making presentations in audible form to the user caused by the data from the tag ICs.

7. The toy and game play apparatus of Claim 6 wherein said audio sound presenting unit includes an amplifier and a speaker.
8. The toy and game play apparatus of Claim 7 wherein said audio sound presenting unit also includes a voice synthesizer.
9. The toy apparatus of Claim 1 wherein each of said tag ICs includes writeable memory, and said master RFID unit is operable to write new data to said tag memory.
10. The toy apparatus of Claim 1 wherein each of said tag ICs includes rewriteable memory, and said master unit is capable of changing the data in said tag memory.
11. The toy or game play apparatus of Claim 1 wherein said master unit is operable to present directions to the user regarding the positioning of one or more of said play objects relative to said master unit, to make a determination, based on data transmitted back by said positioned play object, whether or not that positioned play object has been positioned correctly, and to include in said presentation the results of said determination.
12. The toy apparatus of Claim 1 wherein said master unit includes a plurality of said master antennae that are physically spaced apart, said master antennae being rapidly sequentially operable by said master unit so as to enable said master unit to recognize

which if any of said play object antenna is in the detection region of each said master antenna, said master unit being operable to act upon that recognition.

13. The toy and game apparatus of Claim 12 wherein said master unit is operable to present instructions to the user regarding the positioning of one or more of said play objects relative to one or more of said master antennae, to recognize, based on data transmitted by positioned play objects, the resultant play object positioning at to each of said master antenna, and to make said presentation to the user include the results of such positioning.

14. The toy or game play apparatus of Claim 1 wherein each of said play object includes visual indicia that is different from that of the other play objects, and each of said visual indicia correlate with the specific data on the associated play object.

15. A method of play comprising:

1) providing a plurality of play objects each having a non-self-powered RFID tag IC and an associated play antenna, each of the tag ICs having data that includes at least specific information that is different for each of the play objects,

2) providing a powered master unit that includes a preprogrammed

microcontroller and a RFID reader/interrogator circuit with at least one associated master antenna, the master unit being operable, when the play object antenna of a selective one of the play objects is positioned in a localized detection region relative to said master antenna such as will afford RF communication between the master unit circuit and the tag IC of that selected play object, but without requiring physical contact between the master unit and that play object, to send power to energize that tag IC to cause that tag IC to transmit at least its specific information data back to the master unit, the master unit being operable to recognize that transmitted data and to make a presentation to the user caused by that transmitted data,

3) locating at least one of the play objects so that its antenna is in the detection region relative to the master antenna, and

4) making a presentation to the user caused by the transmitted data from that play object.

16. The play method of Claim 15 further including

having the master unit direct the user to take a specified action with one or more of the play objects, and

having the presentation advise the user of the adequacy or inadequacy of the action that was taken by the user.

17. The play method of Claim 15 wherein each of the tag ICs includes writeable memory, said method further including the step of having the master unit write new data onto the memory of the play object tag IC.

18. The play method of Claim 15 wherein each of the tag ICs includes rewriteable memory, said method further including the step of having the master unit change the data in the memory of the play object tag IC.

19. Toy or game play apparatus comprising:

a doll figure designed and arranged for interactive use with a plurality of play objects, each of said play objects having a non-self-powered RFID tag IC and an associated play object antenna, each of said tag ICs having data that includes at least specific information that is different for each of said play objects, said doll figure having a plurality of extremities, said doll figure being operatively associated with a powered master unit that includes a preprogrammed microcontroller and a RFID reader/interrogator circuit with a plurality of associated master antennae, at least one of said master antennae

being at an extremity of said doll figure,  
said master unit being operable, when said play object antenna of a selected one  
of said play objects is in a localized detection region relative to one of said  
master antennae such as will afford RF communication between said master  
unit circuit and the tag IC of that selected play object, but without requiring  
physical contact between said master unit and that play object, to send power to  
energize that tag IC to cause that tag IC to transmit at least some of its specific  
information data back to said master unit, said master unit also being operable  
to recognize that transmitted data and to make a presentation to the user of the  
toy or game play apparatus caused by that transmitted data,  
said master unit being operable to successively activate one of said master  
antennae at a time, and  
said master unit being operable to recognize which if any of the play objects'  
antennae is in the detection region of each master antenna, and to control said  
presentation to the user accordingly.

20. The toy or game play apparatus of Claim 19 wherein said master unit is operable  
to direct the user to position one or more play objects relative to the toy figure, to

make a determination, based on data transmitted by positioned objects, whether or not each play object has been positioned as directed, and to include in the presentation to the user the results of said determination.

21. The toy or game play apparatus of Claim 19 wherein a plurality of said master antennae are each located at one of said figure extremities.

22. Toy or game play apparatus comprising:

a plurality of play objects each having a non-self-powered RFID tag IC and an associated play object antenna, each of said tag ICs having data that includes at least specific information that is different for each of said play objects,

a play tablet for interactive use with said play objects,

said play tablet having a generally upwardly directed surface with a plurality of play areas,

said play tablet being operatively coupled to a powered master unit that

includes a preprogrammed microcontroller and a RFID reader/interrogator

circuit with a plurality of associated master antennae, each of said master

antennae being located at one of said play areas,

said master unit being operable, when one of said play objects is positioned at

one of said play areas so that the antenna of that play object is in a localized detection region relative to the one of said master antennae at that play area such as will afford RF communication between said master unit circuit and the tag IC of that play object, to send power to energize that tag IC to cause that tag IC to transmit at least some of its specific information data back to said master unit, said master unit also being operable to recognize that transmitted data and to make a presentation to the user of the toy or game play apparatus caused by that transmitted data,

said master unit being operable to successively activate said master antennae at said play areas one at a time, and

said master unit being operable to recognize which if any of said play objects' antennae are in the detection region of each of said master antenna at said play areas, and to control said presentation to the user accordingly.

23. The toy or game play apparatus of Claim 22 wherein each of said play object includes visual indicia that is different from that of the other play objects, and each of said visual indicia correlate with the specific data on the associated play object.
24. The toy or game play apparatus of Claim 23 wherein said master unit is operable

to direct the user to position one or more play objects relative to said play areas, to make a determination, based on data transmitted by positioned objects, whether or not each play object has been positioned as directed, and to include in the presentation to the user the results of said determination.

25. The toy or game play apparatus of Claim 22 wherein said play areas are generally flat, each of said play area master antennae being generally parallel with its associated play area.

26. The toy or game play apparatus of Claim 25 wherein each of said play objects has a generally flat bottom surface for resting upon a play area, and each of said play object antenna is generally parallel with said bottom surface of its play object.

27. The toy or game play apparatus of Claim 25 wherein said play objects are three dimensional and each have a plurality of generally flat support surfaces, said antenna of each of said play objects being disposed within its play object at an angle to said support surfaces of its play object, whereby said play object antenna can effectively couple with the master antenna at the associated play area on which that play object is disposed regardless of which support surface of that play object rests upon that play area.

28. Toy or game play apparatus comprising:

at least one play object having at least one variable characteristic observed by the user, said object having a non-self-powered RFID tag IC and an associated play object antenna, said tag IC including a rewriteable memory that contains data relative to said variable characteristic, and a powered host unit that includes a preprogrammed microcontroller, a RFID reader/interrogator circuit and an associated host antenna, said host unit being operable, when the play object antenna of one of said play objects said is positioned in a localized detection region relative to said host antenna such as will afford RF communication between said host unit circuit and the tag IC of that play object, but without requiring physical contact between said host unit and that play object, to send power to energize said tag IC to cause said tag IC to transmit data as to said variable characteristic back to said host unit, said host unit being operable to recognize that transmitted data, to make a presentation relating to said variable characteristic to the user caused by that transmitted data, and to change said data relating to said variable characteristic of that play object in that play object's rewriteable memory.

29. The toy or game apparatus of Claim 28 further including a second host unit that includes a second preprogrammed microcontroller, a second RFID reader/interrogator circuit and an associated second host antenna, said second host unit being operable, when the play object antenna of one of said play objects is positioned in a localized detection region relative to said second host antenna such as will afford RF communication between said second host unit circuit and the tag IC of that play object, but without requiring physical contact between said second host unit and that play object, to send power to energize said tag IC to cause said tag IC to transmit data as to said variable characteristic back to said second host unit, said second host unit being operable to recognize that transmitted data, and to change said data relating to said variable characteristic of that play object in that play object's rewriteable memory.

30. The toy or game apparatus of Claim 29 wherein said variable characteristic has a quantitative aspect, said first host unit being operable to progressively reduce the quantity of the characteristic of that selected play object, and said second host unit is operable to replenish the quantity of the characteristic of that selected play object.

31. The toy or game apparatus of Claim 29 wherein said play object represents a

container and said variable characteristic is the quantity of a play substance in said container.

32. A toy or game play apparatus comprising:

at least one play object having an RFID tag IC and associated antenna;

a master play unit including a microprocessor and an RFID antenna; and

programming in at least the master for bidirectional RF transmission between

the master and object to implement playing of a game or with a toy.

33. The toy or game play apparatus of Claim 32 wherein there are a plurality of said

play objects, each of which has a memory containing specific data that is different

from that of said other play objects.

34. The toy or game play apparatus of Claim 33 wherein said programming causes

transmission of at least some of said specific data back to said master play unit,

recognizes that transmitted data from each of said play objects, and reacts accordingly.

35. The toy or game play apparatus of Claim 32 wherein said play object has specific

data, said programming causes transmission of at least some of said specific data back

to said master play unit, recognizes that transmitted data from said play object, and

provides a presentation to a user of the apparatus caused by that transmitted data.

36. The toy or game play apparatus of Claim 35 wherein programming causes at least some of that transmitted data to be included in said presentation.

37. The toy or game play apparatus of Claim 33 wherein each of said play object includes visual indicia that is different from that of the other play objects, and each of said visual indicia correlate with the specific data on the associated play object.

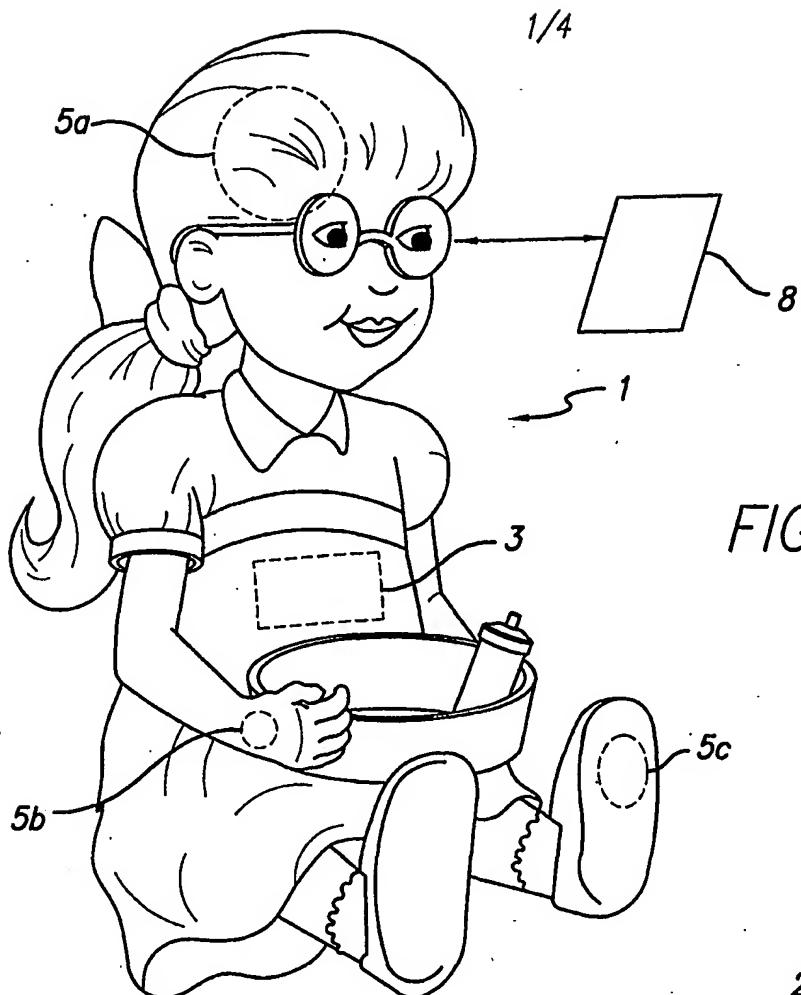
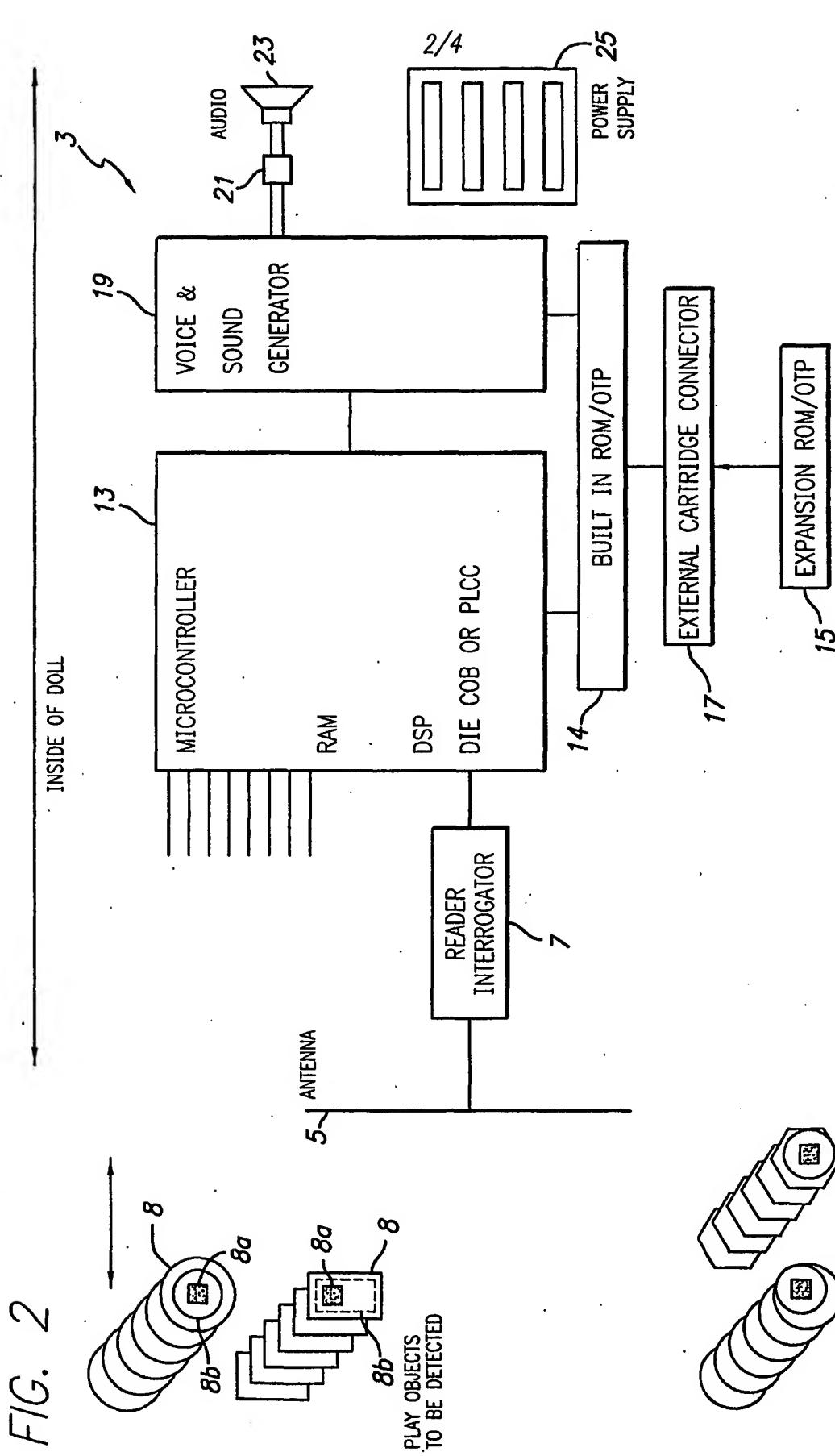


FIG. 1A



FIG. 1B



ADDITIONAL PLAY OBJECTS SOLD WITH ACCESSORY SETS

FIG. 3A

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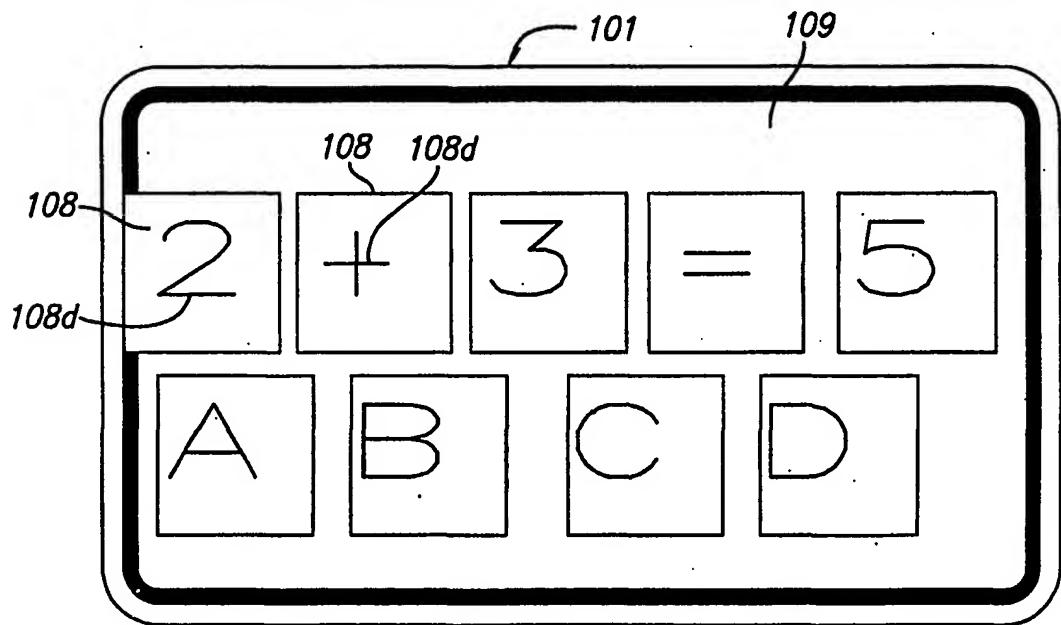
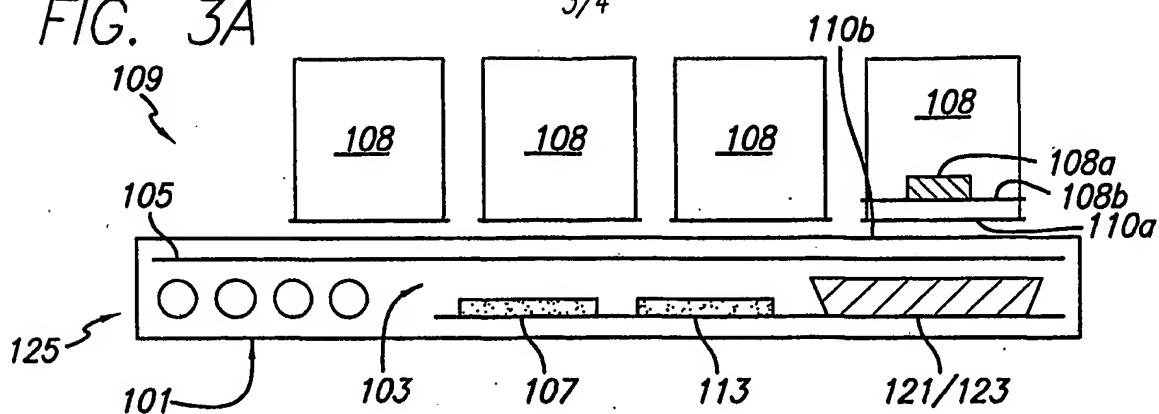
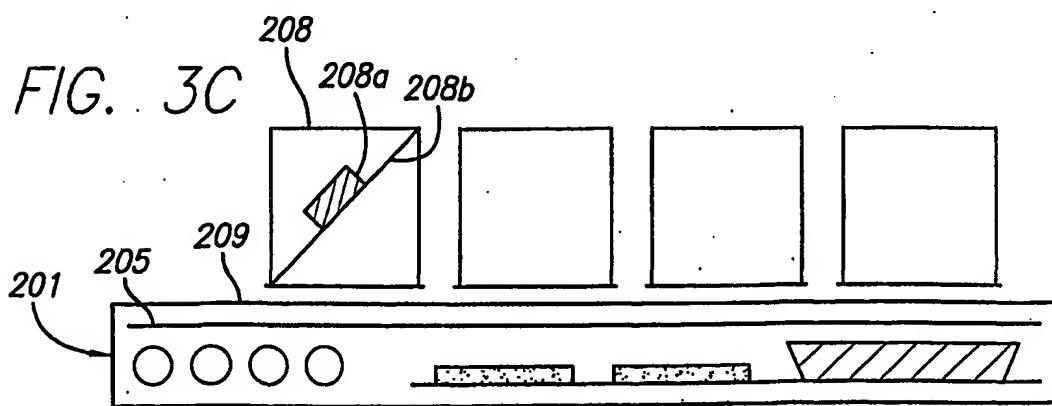


FIG. 3B

FIG. 3C



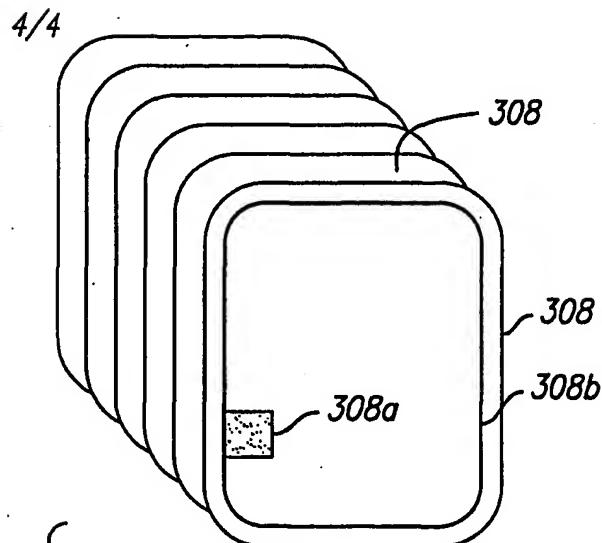


FIG. 4A

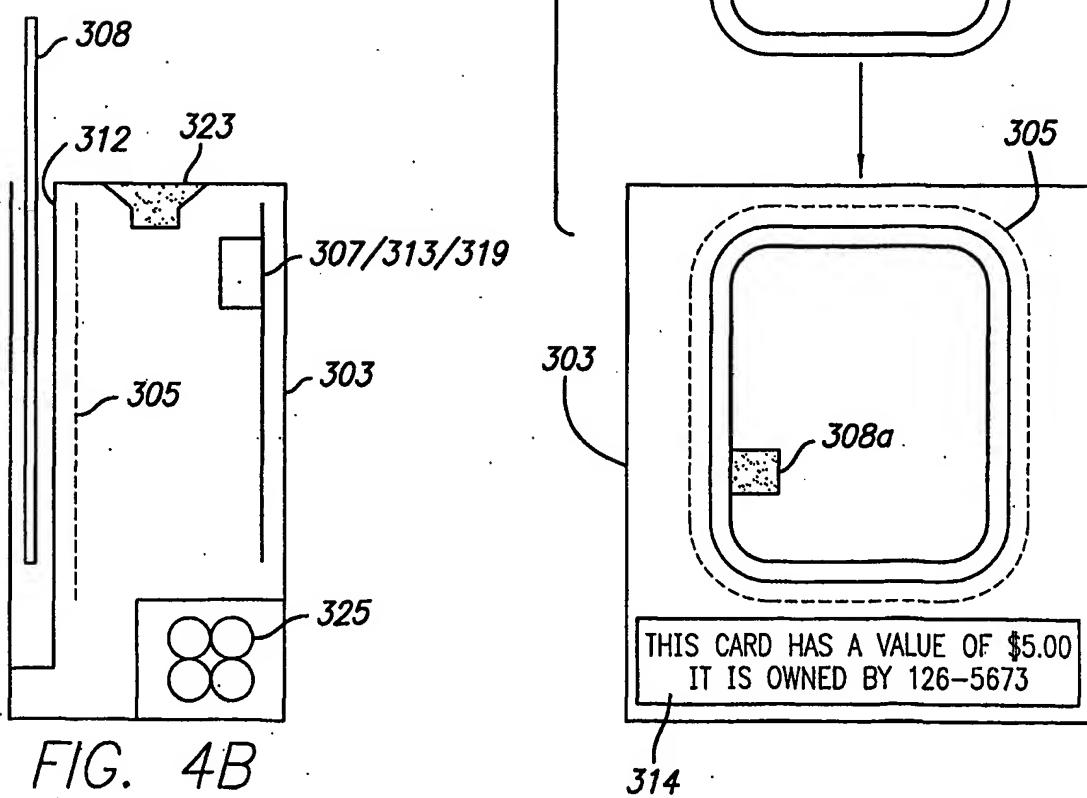


FIG. 4B

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(72) Inventor; and

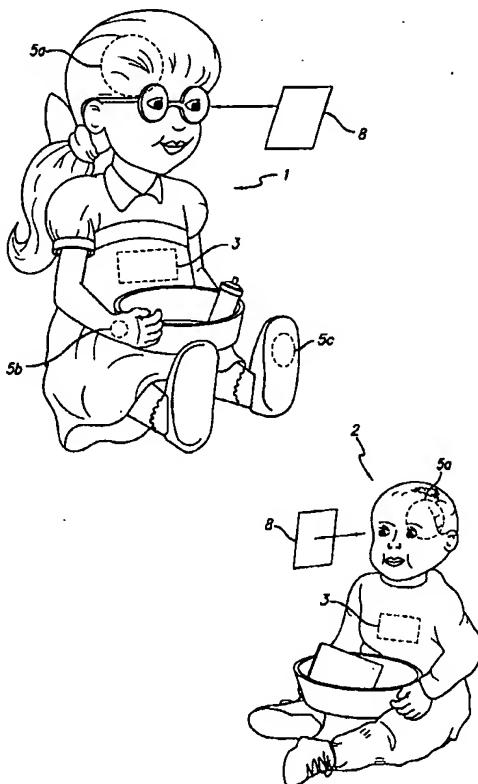
(75) Inventor/Applicant (*for US only*): **BECK, Stephen, C.**

*[Continued on next page]*

(54) Title: OBJECT RECOGNITION TOYS AND GAMES



**WO 02/047013 A3**



(57) Abstract: An interactive doll (1) containing a game unit (3), integral antennas (5a-5c), and a plurality of non-powered playing objects (8). Each playing object (8) contains an RFID (Radio Frequency Identification) tag IC that contains data of different ID information for each playing object (8). When the doll (1) and a play object (8) are positioned so as to allow RF communication between their antenna, the game unit (3) of the doll (1) sends power to energize the tag IC of the play object (8). This causes the RFID tag IC to transmit the ID information data back to the game unit (3) of the doll (1). The doll (1) recognizes the transmitted data and makes a presentation to the user caused by the transmitted data.



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**A. CLASSIFICATION OF SUBJECT MATTER**

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According to International Patent Classification (IPC) or to both national classification and IPC

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Minimum documentation searched (classification system followed by classification symbols)  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,364,735 B1 (Bristow et al.) 02 April 2002 (02.04.2002), Full text and Drawings.	1-18 and 28-37
Y,P	US 6,361,396 B1 (Snyder et al.) 26 March 2002 (26.03.2002), Full text and Drawing.	1-18 and 28-37
Y	US 5,648,999 A (Easterling et al.) 15 July 1997 (15.07.1997), Full text and Drawings.	19-21
Y,P	US 6,380,844 B2 (Pelekis) 30 April 2002 (30.04.2002), Full text and Drawings.	19-21
Y	US 5,636,994 A (Tong) 10 June 1997 (10.06.1997), Full text and Drawings.	19-21
Y	US 5,823,782 A (Marcus et al.) 20 October 1998 (20.10.1998), Full text and Drawings.	22-27
Y	US 5,372,511 A (Cheung) 13 December 1994 (13.12.1994), Full text and Drawings.	22-27
Y,P	US 6,352,478 B1 (Gabai et al.) 05 March 2002 (05.03.2002), Full text and Drawings.	1-37
Y,P	US 6,040,773 A (Vega et al.) 21 March 2000 (21.03.2000), Full text and Drawings.	1-37

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